What is claimed is:

1. In a data storage system including data storage media having at least one rotatable recording surface, a method for storing data segments to said recording surface in concentric data tracks, comprising the steps of:

recording at least one set of data segments onto said recording surface, each recorded data segment including a start, an end and a rotational phase from that data segment to each of the respective ones of all other data segments in the set, wherein the data segments are recorded with coherent relative rotational phases.

2. The method of claim 1, wherein the steps of recording the data segments further includes the steps of recording the data segments such that each data segment further has: (i) a relative start phase from the start of that data segment to the start of each of the respective ones of all other data segments in the set, and (ii) a relative end phase from the end of that data segment to each of the respective ones of all other data segments in the set, wherein the data segments are recorded with coherent relative start phases and coherent relative end phases.

3. The method of claim 2 wherein the step of recording the data segments further includes the steps of recording the data segments such that for each data segment in the set: said relative start, end and rotational phases of that data segment to respective ones of all other data segments in the set are predetermined.

4. The method of claim 2, wherein for each data segment in the set: the rotational phases from that data segment to respective ones of all other data segments in the set comprise the rotational phases from the end of that data segment to the start of the respective ones of all other data segments in the set.

5. The method of claim 4, wherein the step of recording the data segments

further includes the steps of recording the data segment such that for each data segment in the set the rotational phase for that data segment relative to each of the other data segments in the set has one of a limited number of predetermined values.

6. The method of claim 5, wherein the step of recording the data segments further includes the steps of recording the data segments such that for each data segment in the set: the relative rotational phases from that data segment to respective ones of a first subset of the data segments in the set have one of said predetermined values, and the relative rotational phase from that data segment to respective ones of a second subset of the data segments in the set have another of said predetermined values.

7. The method of claim 4, wherein the step of recording the data segments further includes the steps of recording the data segments such that for each data segment in the set the relative rotational phases from that data segment to respective ones of the other data segments in the set are the same.

8. The method of claim 1, wherein each data segment includes one or more tracks.

9. The method of claim 1, wherein the step of recording data segments further includes the steps of recording each data segment such that data tracks in that data segment are offset by a predetermined skew angle.

10. The method of claim 9, wherein the storage system comprises a disk drive including said data storage media rotated by a spindle motor, a data transducer assembly positionable at concentric data track locations on the recording media by an actuator controlled by a servo circuit, and wherein said predetermined skew angle is selected to minimize rotational latency as the transducer is positioned over adjacent

tracks within a data segment.

11. The method of claim 1, wherein the steps of recording the data segments further includes recording the data segments such that each track includes one or more data segments.

12. The method of claim 11, wherein the step of recording the data segments further includes the steps of recording the data segments such that for each data segment in the set the rotational phase from the end of that data segment relative to the start of each of the other data segments in the set has one of a limited number of predetermined values.

13. The method of claim 11, wherein the step of recording the data segments further includes the steps of recording the data segments in one or more concentric recording zones, each recording zone including a plurality of tracks, such that at least in one recording zone each track includes the same number of segments therein.

14. The method of claim 11, wherein the segments are recorded so as to obtain a nearly constant data storage transfer rate when transferring data to and/or from the segments.

15. The method of claim 1, further comprising the steps of receiving one or more incoming data streams and partitioning each incoming data stream into data segments before recording on the media.

16. The method of claim 15, wherein the step of partitioning each data stream further comprises the steps of partitioning that data stream into data segments of equal size.

17. The method of claim 15, wherein the step of partitioning each data stream further comprises the steps of partitioning that data stream into data segments, each data segment including multiple tracks in size.

18. The method of claim 15 further comprising the steps of:

reading the recorded data segments from the storage media, and

reformulating said one or more data streams from the read data segments.

19. The method of claim 1 wherein the step of recording the data segments further includes recording the data segments on the storage media so as to obtain a substantially deterministic data transfer rate to and from the data storage media.

20. The method of claim 1, wherein the step of recording the data segments further includes the steps of recording the data segments such that for each data segment in the set: said relative rotational phases of that data segment to respective ones of all the other data segments in the set are predetermined independent of the start or end track of that data segment.

21. A data storage pattern for storing information on a recording surface of recording media in a storage system, said pattern including at least one set of segments for storing user data in concentric data tracks on the recording surface, wherein each segment includes a start, an end and a rotational phase from that segment to each of the respective ones of all other segments in the set such that the segments have coherent relative rotational phases.

22. The pattern of claim 21, wherein each segment further includes: (i) a

relative start phase from the start of that segment to the start of each of the respective ones of all other segments in the set, and (ii) a relative end phase from the end of that segment to each of the respective ones of all other segments in the set, wherein the segments have coherent relative start phases and coherent relative end phases.

23. The pattern of claim 22 wherein for each segment in the set: said relative start, end and rotational phases of that segment to respective ones of all other segments in the set are predetermined.

24. The pattern of claim 22, wherein for each segment in the set: the rotational phases from that segment to respective ones of all other segments in the set comprise the rotational phases from the end of that segment to the start of the respective ones of all other segments in the set.

25. The pattern of claim 24, wherein for each segment in the set the rotational phase for that segment relative to each of the other segments in the set has one of a limited number of predetermined values.

26. The pattern of claim 25, wherein for each segment in the set: the relative rotational phases from that segment to respective ones of a first subset of the segments in the set have one of said predetermined values, and the relative rotational phase from that segment to respective ones of a second subset of the segments in the set have another of said predetermined values.

27. The pattern of claim 24, wherein for each segment in the set the relative rotational phases from that segment to respective ones of the other segments in the set are the same.

28. The pattern of claim 21, wherein each segment includes one or more tracks.

29. The pattern of claim 21, wherein data tracks in each segment in the set are offset by a predetermined skew angle.

30. The pattern of claim 29, wherein the storage system comprises a disk drive including said data storage media rotated by a spindle motor, a data transducer assembly positionable at concentric data track locations on the recording media by an actuator controlled by a servo circuit, and wherein said predetermined skew angle is selected to minimize rotational latency as the transducer is positioned over adjacent tracks within a segment.

31. The pattern of claim 21, wherein each track includes one or more segments.

32. The pattern of claim 31, wherein for each segment in the set the rotational phase from the end of that segment relative to the start of each of the other segments in the set has one of a limited number of predetermined values.

33. The pattern of claim 31 further comprising one or more concentric recording zones, each recording zone including a plurality of tracks, such that at least in one recording zone each track includes the same number of segments therein.

34. The pattern of claim 31, wherein the segments are recorded so as to obtain a substantially deterministic data storage transfer rate when transferring data to and/or from the segments.

35. The pattern of claim 21, wherein for each segment in the set: said relative rotational phases of that segment to respective ones of all the other segments in the set are predetermined independent of the start or end track of that data segment.

36. The pattern of claim 21 wherein the segments are recorded so as to obtain a substantially deterministic data transfer rate to and from the data storage media.

37. In a storage device including at least one rotatable storage medium having at least one set of segments for storing data in concentric tracks on the storage medium, each segment having a start, an end and a rotational phase from that segment to each of the respective ones of other segments in the set such that the segments have coherent relative rotational phases, the storage device further including a transducer radially moveable relative to said tracks by an actuator controlled by a servo circuit during a seek operation from a starting segment to a destination segment, a method for performing seek operations comprising the steps of:

(a) receiving a request for a seek from a starting segment to a destination segment;

(b) obtaining a seek profile for controlled application of current to the actuator based on the seek profile, wherein the seek profile includes constraints for the seek operation as a function of: (1) a seek distance representing the radial distance between the starting and destination segments, and (2) a seek time based at least on the relative rotational phase between the starting and destination segments; and

(c) applying current to the actuator as a function of said constraints to perform the seek operation.

38. The method of claim 37, wherein step (b) further includes the steps of:

obtaining a seek profile for each seek operation, the seek profile including

constraints as a function of the seek distance and the seek time for that seek operation, such that: (1) each seek operation is completed at the expiration of the respective seek time, and (2) for at least one set of seek distances, the respective seek times are predetermined.

39. The method of claim 38, wherein for at least a subset of the segments, respective inter-segment seek times are the same.

40. The method of claim 38, wherein each of said respective seek times has one of a limited number of predetermined values.

41. The method of claim 38, wherein step (b) further comprises the steps of, for each seek operation, obtaining actuator current level and transducer motion constraints based on the seek time and the seek distance for that seek operation, and step (c) further comprises the steps of applying current to the actuator as a function of at least the current level and the transducer motion constraints to complete the seek operation at the expiration of the seek time.

42. The method of claim 38, wherein the seek time constraint corresponding to each seek operation is based on the relative rotational phase from the end of the starting segment to the start of the destination segment for the seek operation.

43. The method of claim 38, wherein the seek time constraint corresponding to each seek operation is based on a rotation time from the end of the starting segment to the start of the destination segment, wherein the rotation time is a function of the relative rotational phase from the end of the starting segment to the start of the destination segment for the seek operation.

44. The method of claim 37, wherein for each segment in the set: said relative start, end and rotational phases of that segment to respective ones of all other segments in the set are predetermined.

45. The method of claim 37, wherein for each segment in the set the rotational phase for that segment relative to each of the other segments in the set has one of a limited number of predetermined values.

46. The method of claim 45, wherein for each segment in the set: the relative rotational phases from that segment to respective ones of a first subset of the segments in the set have one of said predetermined values, and the relative rotational phase from that segment to respective ones of a second subset of the segments in the set have another of said predetermined values.

47. The method of claim 37 wherein for each segment in the set the relative rotational phases from that segment to respective ones of the other segments in the set are the same.

48. The method of claim 37 wherein each segment includes one or more tracks.

49. The method of claim 37, wherein each track includes one or more segments.

50. A data storage device comprising:

(a) recording media having at least a recording surface for storing information according to a data storage pattern including at least one set of segments for storing user data in concentric data tracks on the recording surface, wherein each segment includes a start, an end and a rotational phase from that segment to each of

the respective ones of all other segments in the set such that the segments have coherent relative rotational phases;

(b) at least one data transducer assembly for reading and/or writing data to the recording surface of the media;

(c) a servo circuit for controlling an actuator to position the transducer assembly at segments on the recording surface; and

(d) a controller adapted for transferring data to and from said segments on the recording surface, wherein: (1) during data storing operations in each segment, the controller controls the transducer via the servo circuit to record data in that segment, such that data is stored in the segments on the recording surface with coherent phase, and (2) during data retrieval operations from each segment, the controller controls the transducer via the servo circuit to retrieve data from each segment.

51. The storage device of claim 50, wherein each segment further includes: (i) a relative start phase from the start of that segment to the start of each of the respective ones of all other segments in the set, and (ii) a relative end phase from the end of that segment to each of the respective ones of all other segments in the set, wherein the segments have coherent relative start phases and coherent relative end phases.

52. The storage device of claim 51 wherein for each segment in the set: said relative start, end and rotational phases of that segment to respective ones of all other segments in the set are predetermined.

53. The storage device of claim 51, wherein for each segment in the set the rotational phase from the end of that segment relative to the start of each of the respective ones of other segments in the set has one of a limited number of

predetermined values.

54. The storage device of claim 53, wherein for each segment in the set: the relative rotational phases from that segment to respective ones of a first subset of the segments in the set have one of said predetermined values, and the relative rotational phase from that segment to respective ones of a second subset of the segments in the set have another of said predetermined values.

55. The storage device of claim 53, wherein for each segment in the set the relative rotational phases from that segment to respective ones of the other segments in the set are the same.

56. The storage device of claim 50, wherein each segment includes one or more tracks.

57. The storage device of claim 56, wherein tracks in each segment in the set are offset by a predetermined skew angle, wherein said predetermined skew angle is selected to minimize rotational latency as the transducer is positioned over adjacent tracks within a segment.

58. The storage device of claim 50, wherein each track includes one or more segments.

59. The storage device of claim 58, wherein for each segment in the set the rotational phase from the end of that segment relative to the start of each of the other segments in the set has one of a limited number of predetermined values.

60. The storage device of claim 58 further comprising one or more concentric

recording zones, each recording zone including a plurality of tracks, such that at least in one recording zone each track includes the same number of segments therein.

61. The storage device of claim 50, wherein for each segment in the set: said relative rotational phases of that segment to respective ones of all the other segments in the set are predetermined independent of the start or end track of that data segment.

62. The storage device of claim 50 wherein the segments are recorded so as to obtain a substantially deterministic data transfer rate to and from the data storage media.

63. The storage device of claim 50, wherein:

(i) the controller includes at least one seek profile, for generating actuator current commands based on the seek profile to perform at least one seek operation from a starting segment to a destination segment, the seek profile including constraints for the seek operation as a function of: (1) a seek distance representing the radial distance between the starting and destination segments, and (2) a seek time based at least on the relative rotational phase between the starting and destination segments; and

(ii) the servo circuit include a driver coupled to controller, wherein the driver receives the at least one current command value to generate an input current to the actuator as a function of said constraints to perform the seek operation.

64. The storage device of claim 53, wherein the seek profile includes constraints as a function of the seek distance and the seek time for the seek operation, such that: (1) each seek operation is completed at the expiration of the respective seek time, and (2) for at least one set of seek distances, the respective seek times are predetermined.

65. The storage device of claim 54, wherein for at least a subset of the data segments, respective inter-segment seek times are the same.

66. The storage device of claim 54, wherein each of said respective seek times has one of a limited number of predetermined values.

67. The storage device of claim 54, wherein, for each seek operation, the controller further obtains actuator current level and transducer motion constraints based on the seek time and the seek distance for that seek operation, and the driver applies current to the actuator as a function of at least the current level and the transducer motion constraints to complete the seek operation at the expiration of the seek time.

68. The storage device of claim 54, wherein the seek time constraint corresponding to each seek operation is based on the relative rotational phase from the end of the starting segment to the start of the destination segment for the seek operation.

69. The storage device of claim 54, wherein the seek time constraint corresponding to each seek operation is based on a rotation time from the end of the starting segment to the start of the destination segment, wherein the rotation time is a function of the relative rotational phase from the end of the starting segment to the start of the destination segment for the seek operation.

70. The storage device of claim 53 wherein for each segment in the set: said relative start, end and rotational phases of that segment to respective ones of all other segments in the set are predetermined.

71. The storage device of claim 53, further comprising means for receiving one or more incoming data streams and partitioning each incoming data stream into data segments for storage in the storage device.

72. The storage device of claim 71, further comprising means for combining data segments read from the storage device to reformulate one or more output data streams.